

CLAIMS

1. A biological material comprising:
 - 2) at least one cell type selected from the group consisting of endothelial cells, glandular cells, skin adnexa, germinative cells of hair bulbs and optionally keratinocytes; and
 - 5) a biocompatible and biodegradable three-dimensional matrix comprising at least one hyaluronic acid derivative and optionally collagen and/or fibrin.
1. A biological material comprising:
 - 2) at least one cell type selected from the group consisting of endothelial cells, glandular cells, skin adnexa, germinative cells of hair bulbs, and optionally keratinocytes, cultivated in presence of a medium treated with fibroblasts or in a co-culture with fibroblasts; and
 - 6) b) a biocompatible and biodegradable three-dimensional matrix comprising at least one hyaluronic acid derivative and optionally collagen and/or fibrin.
1. 3. A biological material according to claim 1 or 2, wherein the endothelial cells are taken from the umbilical vein or from dermis or other tissue wherein blood vessels are present.
1. 4. A biological material according to claim 1 or 2, wherein the glandular cells are liver cells or Langerhans islet cells.
1. 5. A biological material according to claim 1 or 2, wherein the skin adnexa are sebaceous glands, sweat glands, hair bulbs and the germinative cells are taken from autologous, homologous or heterologous hair bulbs.
1. 6. A biological material according to claims 1-5, wherein the hyaluronic acid derivative is an ester of hyaluronic acid wherein part or all the carboxy functions are esterified with alcohols of the aliphatic, aromatic, arylaliphatic, cycloaliphatic, heterocyclic series.
1. 7. A biological material according to claims 1-5, wherein the hyaluronic acid derivative is an autocrosslinked ester of hyaluronic acid wherein a part or all of the carboxy groups are esterified with the alcoholic functions of the same polysaccharide chain or other chains.
1. 8. A biological material according to claims 1-5, wherein the hyaluronic acid derivative is a crosslinked ester of hyaluronic acid wherein a part or all of the

- 3 carboxy groups are esterified with polyalcohols of the aliphatic, aromatic,
4 arylaliphatic, cycloaliphatic, heterocyclic series, generating crosslinking by
5 means of spacer chains.
- 1 9. A biological material according to claims 1-5, wherein the hyaluronic acid
2 derivative is a hemiester of succinic acid or a heavy metal salt of the hemiester
3 of succinic acid with hyaluronic acid or with partial or total hyaluronic acid
4 esters.
- 1 10. A biological material according to claims 1-5, wherein the hyaluronic acid
2 derivative is a sulphated or N-sulphated hyaluronic acid or derivatives thereof.
- 1 11. A biological material according to claims 1-5, wherein the hyaluronic acid
2 ester is a benzyl ester with a degree of esterification of between 25% and
3 100%.
- 1 12. A biological material according to claims 1-11, wherein component b) is used
2 in the form of a nonwoven fabric, sponges, granules, microspheres,
3 membranes, films, guide channels, gauzes and combinations of the same with
4 one another.
- 1 13. A biological material according to claim 12, wherein component b) is used in
2 the form of a nonwoven fabric.
- 1 14. A process for the preparation of a biological material according to claims 1-13,
2 comprising the following steps:
3 i) isolating cells selected from the group consisting of endothelial cells,
4 glandular cells, skin adnexa, germinative cells of hair bulbs and optionally
5 keratinocytes;
6 ii) preparing a biocompatible and biodegradable three-dimensional matrix
7 comprising at least one hyaluronic acid derivative and optionally collagen
8 and/or fibrin;
9 iii) seeding at least one type of said cells on said matrix optionally in presence
10 of a medium treated with fibroblasts or in a co-culture with fibroblasts.
- 1 15. A process for the preparation of a biological material according to claims 1-13,
2 comprising the following steps:
3 i) isolating endothelial cells from human umbilical vein by enzymatic digestion
4 with collagenase;

- 5 ii) amplification on collagen-treated dishes;
- 6 iii) preparing a biocompatible and biodegradable three-dimensional matrix
- 7 comprising at least one hyaluronic acid derivative and optionally collagen
- 8 and/or fibrin;
- 9 iv) seeding said endothelial cells, optionally in association with the cells defined
- 10 in claim 1 or 2, on said matrix optionally in presence of a medium treated with
- 11 human fibroblasts in primary culture or in a co-culture with human fibroblasts.
- 1 16. Biological material according to claims 1-13, for use in human and veterinary
- 2 surgery.
- 1 17. A biological material according to claims 1-13 wherein component a)
- 2 comprises endothelial cells alone or in association with skin adnexa,
- 3 germinative cells or keratinocytes, in skin transplants.
- 1 18. Biological material according to claims 1-13, for use in skin and scalp
- 2 transplants.
- 1 19. Biological material according to claims 1-13, for use in skin transplants
- 2 wherein component a) comprising endothelial cells facilitates the mechanism of
- 3 neo-vascularization of the transplanted skin.
- 1 20. Biological material according to claims 1-13, wherein component a) comprises
- 2 germinative cells of hair bulbs, for use in scalp transplants.
- 1 21. Biological material according to claims 1-13, wherein component a) comprises
- 2 liver cells, for use in liver tissue transplants.
- 1 22. Biological material according to claims 1-13, wherein component a) comprises
- 2 islets of Langerhans, for use in cases of insufficient insulin production.
- 1 23. Biological material according to claims 1-13, wherein component a) comprises
- 2 endothelial cells, for use in surgery.
- 1 24. Biological material according to claim 23, for use in cardiovascular, aesthetic
- 2 and oncological surgery.
- 1 25. Biological material according to claims 23-24, for use in surgery to enhance
- 2 the biological process of tissue vascularization.

19

- 1 26. Biological material according to claims 1-13, for the screening of medicaments
2 or toxic substances.
- 1 27. Biological material according to claims 1-13, as a support for gene
2 transfection.
- 1 28. Biological material according to claim 27, for use in gene transfection.

add a }
add a }
add 2 }
B add E' > ADD
F' > add 91